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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-2707A
Plant ID No.:	057-00046
Applicant:	Lumber & Things, Inc.
Facility Name:	Keyser Facility
Location:	Keyser, Mineral County
SIC Code:	2448 - Wood Pallets and Skids
Application Type:	Modification
Received Date:	December 1, 2016 (Re-submitted; 1st submitted August 9, 2016)
Engineer Assigned:	John Legg
Fee Amount:	$1,000.00
Date Received:	January 18, 2017
Complete Date:	January 18, 2017
Applicant Ad Date:	January 07, 2017
DAQ Ad Date:	March 15, 2007
Newspaper:	*The Cumberland Times*
UTM's:	Easting: 676.83 km Northing: 4,368.21 km Zone: 17
Description:	Increase the hourly grinding rate and number of operating hours (operating schedule) for the tub grinding operation.

SUMMARY

In the past, the tub grinding operation at Lumber & Things, Inc.'s Keyser Facility was a minimal part of their business. However, with the passage of time, this is no longer true. Increased business, coupled with a limited hourly grinding rate and a restrictive operating schedule has led to a lack of operational flexibility.

Lumber & Things, Inc., through this modification, would like to increase production by operating both of their tub grinders:

- at the same time, and
- for more hours per year.

The current permit, R13-2707, limits the hourly grinding rate by allowing only one of the two tub grinders to operate at a time. The average grinding rate is 200 ton/hr [(135 ton/hr + 265 ton/hr)/2]. Lumber & Things, Inc. is proposing to operate both grinders at the same time for a processing rate of 400 ton/hr [(135 + 265)ton/hr].

Lumber & Things, Inc. is also proposing to increase the operating schedule for tub grinding from 1,040 hr/yr (4 hr/day; 5 day/wk; 52 wk/yr) to 5,824 hr/yr (16 hr/day; 7 day/wk; 52 wk/yr).

By increasing the hourly grinding rate and the operating schedule, allowable production will increase by a factor of 11.2, from 208,000 ton/yr (1,040 hr/yr * 200 ton/hr) to 2,329,600 ton/yr (5,824 hr/yr *400 ton/hr).

DESCRIPTION OF PROCESS

The process consists of two wood grinders/grinding operations performed as part of a scrap wood/pallet recycling operation. The grinding operations are performed to process wood into wood chips, which are sold and/or transported off-site for boiler fuel and landscape mulch.

Each wood grinder is powered by a diesel motor that produces criteria pollutants (PM10, NOx, CO, SOx, and VOC) from consuming diesel fuel. Grinder 1 (Morbark 1300) can produce wood chips/mulch at a maximum rate of 135 TPH. Grinder 2 (Vermeer TG7000) is rated at a maximum wood chip/mulching rate of 265 TPH.

Table 1: R13-2707A - Emission Units Table.

Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed/ Modified	Design Capacity	Control Device
1S	1E	Diesel Engine Excavator/Loader	2000 (1)	160 HP	None
2S	2E	Tub Grinder 1 Morbark 1300	2000 (1)	135 ton/hr	Water Spray
3S	3E	Diesel Engine - CAT BDT00588 associated with Tub Grinder 1	2000 (1)	760 HP	None
4S	4E	Tub Grinder 2 Vermeer TG7000	2000 (1)	265 ton/hr	Water Spray
5S	5E	Diesel Engine - CAT BDT04729 associated with Tub Grinder 2	2000 (1)	840 HP	None

(1) Year installed changed from 2007 to year 2000 based on first permit application (R13-2707) installing equipment in early 2001.

SITE INSPECTION

The facility was last inspected on October 10, 2014 by Karl Dettinger from the DAQ's North Central (Fairmont) Regional Office. The overall result for the facility was a code 30 which means in compliance.

Directions to the facility:

One (1) mile east of Keyser on Route 46, then north on Route 8. Right onto Harland Ridder Road for 0.5 miles to Lumber & Things, Inc. on right.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

The writer reviewed Lumber & Things, Inc.'s calculations and found them to be mathematically correct. With minor corrections/changes (such as grinding PM_{10} = PM / 2.1 instead of PM_{10} = 0.60 * PM), the following information came from application R13-2707A, Attachment N, "Supporting Emission Calculations":

The following methodology was used to determine the estimated emissions from the on-site grinding of wood processed and recycled for off-site sale and use. Total emissions from the grinding operations shall consist of the cumulative PM/PM10 emissions of Tub Grinders 1 and 2, and the criteria pollutant emissions from their Diesel Motors, rated at 760 HP and 840 HP, respectively.

The computations are based on AP-42 emission factors, manufacturer provided emissions factors, horsepower rating on the diesel motors, and estimated maximum yearly hours of run time to determine emissions from the diesel motors.

The wood grinding equipment consists of the following:

Grinder 1 (Morbark 1300)	135 TPH	760 HP Diesel motor
Grinder 2 (Vermeer TG7000)	265 TPH	840 HP Diesel motor

The grinders may be used simultaneously for a maximum production rate of 400 TPH. The grinding equipment can be operated up to a maximum of 16 hr/day, 7day/wk, 52 wk/yr for a total of 5,824 hr/yr. Currently, the operation operates one four (4) hour shift per day for 5 day/wk.

PM Emissions from Grinding

The following equation was used with the AP-42 emission factor (0.024 lb/ton) to estimate emissions. PM_{10} is assumed to be 47.62% of the PM value (PM_{10} = PM / 2.1 = 0.4762 * PM). Water spray will reduce emissions by 50%.

Controlled Emissions (lb/yr) = Emission Factor (lb/ton) * (ton/hr) * (usage hr/yr) * 0.50 (control factor from using water sprays)

Table 2: Grinding Emissions After Controls from Tub Grinding.							
Grinders in Operation	Pollutant	AP-42 Emission Factor (lb/ton)	Throughput (ton/hr)	Hours of Operation (hr/yr)	[1] Controlled Emissions (water spray)		
					(lb/hr)	(lb/yr)	(ton/yr) [2]
Grinder 1	PM	0.024	135	5,824	1.62	9,434.9	4.72
	PM_{10}	0.0144	135	5,824	0.77	5660.9	2.25
Grinder 2	PM	0.024	265	5,824	3.18	18,520.3	9.26
	PM_{10}	0.0144	265	5,824	1.51	11,112.2	4.41
Total (Grinders 1 and 2)	PM	0.024	400	5,824	4.80	27,955.2	13.98
	PM_{10} [3]	0.0144	400	5,824	2.29	16,773.1	6.66

(1) 50% control of PM/PM10 emissions from using of water sprays.
(2) Annual emission rate based on operating 5,824 hrs (16 lb/day; 7 day/wk; 52 wk/yr).
(3) PM_{10} = PM / 2.10 = 0.4762 * PM

Combustion Emissions from Diesel Motors - The following equation was used with the manufacturer emission factors and the site specific parameters to estimate emissions.

Emissions (lb/yr) = Emission Factor (lb/hp-hr) * (Motor HP) * (Maximum Usage hr/yr)

Table 3: Combustion Emissions from the Diesel Engine (3S; 3E) associated with Grinder 1 (Morbark).					
Pollutant	Manufacturer Emission Factor (lb/HP-hr)	Diesel Motor (HP)	Maximum Hours of Operation (hr/yr)	Estimate Emissions	
				(lb/hr)	(ton/yr)
PM	0.00082	760	5,824	0.62	1.81
NOx	0.01512	760	5,824	11.49	33.46
CO	0.01874	760	5,824	14.24	41.47
SOx [1]	0.00205	760	5,824	1.56	4.54
VOC	0.00214	760	5,824	1.63	4.74

(1) From AP-42, Table 3.3-1. "Emission Factors for Uncontrolled Gasoline and Diesel Industrial Engines".

Table 4: Combustion Emissions from Diesel Engine (5S; 5E) associated with Grinder 2 (Vermeer).					
Pollutant	Manufacturer Emission Factor (lb/HP-hr)	Diesel Motor (HP)	Hours of Operation (hr/yr)	Estimate Emissions	
				(lb/r)	(ton/yr)
PM	0.00082	840	5,824	0.69	2.01
NOx	0.01512	840	5,824	12.70	36.98
CO	0.01874	840	5,824	15.74	45.84
SOx (1)	0.00205	840	5,824	1.72	5.01
VOC	0.00214	840	5,824	1.80	5.23
(1) From AP-42, Table 3.3-1. "Emission Factors for Uncontrolled Gasoline and Diesel Industrial Engines".					

Table 5: Annual Emissions Summary Table for Lumber & Things, Inc., Keyser Facility.				
Pollutant	Combustion/ Diesel Engine Emissions (ton/yr) (2)		Controlled (1) Grinding Emissions (ton/yr)	Total (2)
	Grinder 1	Grinder 2		(ton/yr)
PM	1.81	2.01	13.98	17.80
NOx	33.46	36.98	N/A	75.50
CO	41.47	45.84	N/A	91.14
SOx	4.54	5.01	N/A	9.55
VOC	4.74	5.23	N/A	9.97
(1) Grinding Emissions Controlled 50% by using Water Sprays. (2) Annual grinding and combustion emissions based on operating 5,824 hr/yr.				

REGULATORY APPLICABILITY

45CSR7 - To Prevent and Control Particulate Matter Air Pollution From Manufacturing Processes and Associated Operations

The facility is proposing to increase hourly and annual wood chipping/mulching which will result in increased PM grinding emissions from the tub grinders. PM emissions generated from the facility are regulated by the 20% opacity limit set forth in 45CSR7-3.1. In an effort to minimize visible PM emissions resulting from grinding, the grinders are required to have water sprays on when operating. The water sprays are credited with a 50% reduction in PM emissions.

This source is defined, in 45CSR7-2.39a, as a type 'a' source operation with a maximum process rate of 800,000 lbs/hr (400 ton/hr * 2,000 lb/ton).

In accordance with 45CSR7-4.1, the facility shall not exceed a particulate matter emission rate of 50 lb PM/hr (based on processing 800,000 lbs/hr of wood). The facility is proposing to emit (before controls/water sprays) 9.6 lb/hr of PM (based on using an EPA emission factor of 0.024 lb/ton and a wood processing rate of 400 ton/hr, both grinders operating). Therefore, the facility will demonstrate compliance with this rule. In addition, the facility will operate water sprays on each of the grinders when the grinders are in operation to reduce PM emissions (by a factor of 50%) to 4.8 lb/hr (after controls).

45CSR13 - Permits for Construction, Modification, Relocation, and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, and Procedures for Evaluation

Lumber & Things, Inc. re-submitted an permit application on December 1, 2016, and paid a $1,000.00 application fee (on January 18, 2017); ran a legal advertisement (in ***The Cumberland Times*** on January 7, 2017); and provided a copy of the newspaper affidavit to the DAQ (on January 18,2017), at which time the application was deemed to be complete.

45CSR22 - Air Quality Management Fee Program

The facility is a minor source for regulated air pollutants. Therefore, the facility will be required to pay annual fees in order to maintain a certificate to operate (CTO).

Federal Regulations — No federal regulations apply to the two (2) diesel engines that power the tub grinders.

40 CFR 60, Subpart IIII — The two (2) diesel engines were constructed in 2000. Subpart IIII covers diesel engines constructed in 2006 and later.

40 CFR 63 Subpart ZZZZ — The two (2) diesel engines associated with the tub grinders a considered by the DAQ to be portable non-road engines. Per requirement 4.1.5 in R13-2707A:

4.1.5. The permittee must relocate the tub grinders (1 & 2) and their associated diesel engines on the Keyser plant site at least once per year to maintain the portable non-road engine status that exempts the diesel engines from 40 CFR63, Subpart ZZZZ.

Per 4.4.7 in R13-2707A:

4.4.7. To demonstrate compliance with section 4.1.5. of this permit, the permittee shall maintain records documenting the tub grinders (1 & 2) and their associated engines were relocated on the Keyser plant site at least one time per year. An example record could be a dated photograph taken in front of the grinder(s) showing the UTM or longitude/latitude coordinates of the equipment location.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

The combustion of diesel fuel result in the formation of very small amounts of Hazardous Air Pollutants (HAP).

AIR QUALITY IMPACT ANALYSIS

Because this is a minor modification as defined in 45CSR14 no modeling was performed.

MONITORING OF OPERATIONS

The following variables will be monitored:

- The amount of wood processed.
- The hours of operation of the grinders.
- The amount of water used for water sprays.
- The movement/relocation of the tub grinders and engines on the Keyser plant site.

RECOMMENDATION TO DIRECTOR

Permit application R13-2707A was submitted by Lumber & Things, Inc. to increase hourly and annual wood chipping/mulching production at their Keyser, Mineral County, WV facility. The application has been reviewed and was determined to meet all applicable requirements. It is therefore, recommended for the Air Director's approval.

John Legg
Permit Writer

March 24, 2017
Date